UNITED STATES DISTRICT COURT
EASTERN DISTRICT OF MICHIGAN
SOUTHERN DIVISION

In re: FLINT WATER CASES	Civil Action No. 5:16-cv-10444-JEL-MKM (consolidated) Hon. Judith E. Levy Mag. Mona K. Majzoub
Elnora Carthan, et al., Plaintiffs, vs. Governor Rick Snyder, et al., Defendants.	Civil Action No. 5:16-cv-10444-JEL-MKM

HIGHLY CONFIDENTIAL
REMOTE VIDEOTAPED DEPOSITION OF
JOSEPH GRAZIANO, PH.D.
VOLUME II

Friday, October 30, 2020
at 9:01 a.m.

Taken at: Residence of Joseph Graziano, Ph.D.
Mount Kisco, New York

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I N D E X

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(No exhibits marked.)

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P R O C E E D I N G S

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VIDEOGRAPHER: We are now on the record.

My name is Robert Martignetti. I'm a videographer for Golkow Litigation Services.

Today's date is October 30th, 2020, and the time is 9:01 a.m.

This continued remote video deposition is being held In Re: Flint Water Cases.

The deponent is Joseph Graziano, Ph.D.

All parties to this deposition are appearing remotely. Due to the nature of remote reporting, please pause briefly before speaking to ensure all parties are heard completely.

Counsel will be noted on the stenographic record.

The court reporter is Sara Clark.

Dr. Graziano, do you understand that you're still under oath?

THE WITNESS: Yes, I do.

VIDEOGRAPHER: Thank you.

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JOSEPH GRAZIANO, PH.D.

being by me previously duly sworn, as hereinafter certified, testifies and says as follows:

CONTINUED EXAMINATION

BY MR. TER MOLEN:

Q. Good morning, Dr. Graziano.

A. Good morning.

Q. And I think on the positive side, Doctor, after going through the materials, I expect to have less than an hour of questioning for you today, just for your information, and then we'll turn it over to other counsel who may or may not have questions of their own.

So we looked yesterday briefly at a study by Taylor. I think we marked that as Exhibit 7. But we didn't get into the substance, and I'd like to talk a little bit about the substance today.

MR. TER MOLEN: Sam, if you don't mind putting that Taylor study back up, please.

Q. Doctor, I know we talked about a number of studies yesterday that you hadn't seen before.

Did you get a chance to look at anything

last night?

A. I did not.

Q. Okay.

A. As I said, we lost power at some point in the evening last night, so...

Q. Wow.

MR. MYLER: Sorry, Mark. Just give me one second --

MR. TER MOLEN: That's okay.

MR. MYLER: -- to pull up the version we sent last night with the exhibits.

MR. TER MOLEN: Great. Thank you.

BY MR. TER MOLEN:

Q. And just as a refresher, Doctor, this is a study that was looking at the effects of low-level prenatal lead exposure, meaning that the mother was exposed while pregnant with the child, to lead, and then testing the child's IQ at ages 4 and 8, right?

A. Yes.

Q. I'm sorry. I couldn't quite hear that.

A. Yes.

Q. Okay. Thank you.

MR. TER MOLEN: And then, Sam, if we can

go to Page 165.

Here. Thank you. Can we -- perfect.

Q. So this is the -- if you can see this, Doctor, looking on the left side, under Section 3.2, looking at the mean prenatal blood lead was 3.67 micrograms per deciliter, right?

A. Yes.

Q. Okay. And then noting that the mean child blood lead was 4.2 micrograms per deciliter.

Do you see that?

A. Yes.

Q. Okay. And then noting in the next phrase of that same sentence that 26.6 percent of the children had levels greater than 5 micrograms per deciliter, right?

A. Right.

Q. Okay. And then going down to the next section, Section 3.3, "Associations between blood lead and IQ," right?

A. Yes.

Q. And then the first sentence reads, "There was no evidence for any differences in 4-year IQ scores by prenatal lead category," meaning whether the mother was less than 5 or

greater than 5, correct?

A. Yes.

Q. Okay. And then at age 8 years, there was the discovery that verbal IQ was actually higher for children whose mothers had been exposed to higher lead levels than children whose mothers had been exposed to lower lead levels, right?

A. I see that.

Q. Okay. And then going to the next page, Section 3.4 --

MR. TER MOLEN: I'm sorry. Same page, Sam. I'm sorry. I'm just shifting over the column there on the right side.

Q. Under Section 3.4, "There was no evidence for an effect of early pregnancy Hb concentration" -- I'm sorry. We can skip that.

MR. TER MOLEN: Let's move down, if you don't mind, Sam, to the --

A. Can I just -- so there was no evidence for an early pregnancy hemoglobin concentration.

Q. Thank you. Thank you. I appreciate your --

A. Sure.

Q. -- explaining that, Doctor.

MR. TER MOLEN: Let's scroll down there toward the end, then, Sam.

Q. Okay. Under "Discussion" -- I'm sorry -- just reading the first sentence -- couple sentences there, "We found no evidence for an adverse association of prenatal blood lead levels measured in the first trimester with child IQ at either 4 or 8 years of age."

Right?

A. That's what it says.

Q. Okay. And then it noted that "Maternal education was the strongest variable" for IQ, right?

A. It always is.

Q. It always is, yeah. Exactly.

Okay. Do the results of this study surprise you, Doctor?

MR. LANCIOTTI: Objection; form; foundation.

A. The results of this study are discordant with a large body of literature.

Q. Well, okay. Has, in fact, there been extensive study of prenatal lead exposure and IQ, Doctor?

A. Yes, there has. There has been some.
Q. Okay. Sitting here today, Doctor, can you name another study that focuses specifically on prenatal exposure and child IQ?
A. My own work.
Q. Okay.
A. My own work --
Q. Is -- I'm sorry.
A. -- we actually had blood lead measurements at mid-pregnancy --
Q. Okay.
A. -- at birth, at 6, 12, 18, and 24 months of age.
Q. Uh-huh.
A. And we actually asked the question, which is more important? Is it prenatal exposure, i.e., blood lead measurements in mid-pregnancy, or is it early postnatal exposure, when the child's brain development is, as you know, exploding during the first two years of life. And, in fact, we demonstrated very clearly that it's postnatal exposure, the area under the curve of the blood lead measurements in the first two years of life, that is much more important than prenatal -- than

prenatal exposure.

So we specifically were asking this question, which is more important, prenatal or early postnatal? And it turned out to be early postnatal.

Q. Okay. Well, that's very interesting, Doctor. Thank you for -- for highlighting that.

And with respect to the work that you did in prenatal exposure, that's work that you did in Yugoslavia, right?

A. That is correct.

Q. Okay. And we're talking, in Yugoslavia, about blood lead levels that were much higher than the blood lead levels involved here, right?

MR. LANCIOTTI: Objection; form.

A. We're talking about a range. Recall, please, that we worked in two towns in Yugoslavia. One, Pristina, the capital city of Kosovo, where there wasn't a lead mine and a lead smelter, and the other, a mining town.

But, yeah, without question, the majority of children in the study had blood leads that were higher than those we're talking about here.

Q. Yeah, exactly. Thank you, Doctor.
A. Sure.
Q. Looking at this column on the right side -- actually, before we get there, Doctor, just -- you're familiar with the World Health Organization, right?
A. I certainly am.
Q. Okay. And are they, from your standpoint, a respected international body?
A. Yes, they are, despite what our president says.
Q. And you're aware that the World Health Organization has looked at the concerns associated with exposure to lead, right?
A. Right.
MR. LANCIOTTI: Objection; form.
Q. Okay. And in 2010, do you recall that the World Health Organization came out with an estimate of what effect blood lead levels had on IQ?
MR. LANCIOTTI: Objection; form; foundation.
A. I do not specifically recall.
Q. Okay.

MR. TER MOLEN: Sam, if you don't mind highlighting that language there on the right side there.

Q. And I'll represent to you, Doctor, as reflected in this -- whoops -- in this study, the Taylor study that in 2010 -- that's okay -- who estimated that each 1 microgram per deciliter increase in blood lead resulted in a decrement of 0.25 IQ points.

Do you see that?

A. I do.

Q. Okay. Have you specifically looked at that WHO estimate?

A. No.

Q. Okay.

A. It is what it is. They base that on -- they don't conduct their own original research. They're trying to sum up --

Q. Sum up the research that other people have done, right?

A. Yes.

Q. And, obviously, in -- 2010 was after the 2005 publication of the study by Dr. Lanphear and yourself that was the pooled analysis of the seven

different cohorts, right?

A. Right.

Q. And you would expect that WHO had looked at that pooled analysis and included that data in the overall set of data that they looked at for purposes of determining this estimate, right?

MR. LANCIOTTI: Objection; form; foundation.

A. Right.

Q. Okay. Would you, Doctor, then, defer to the estimate that WHO made after looking at all of the data available?

MR. LANCIOTTI: Objection; form.

A. Not necessarily.

Q. Okay.

A. You know, when one conducts original research with a group of colleagues who no one feels are a distinguished group of scientists, one cannot help but be maybe more powerfully influenced by one's own work than by an organization that is summing up works that are of mixed quality.

Q. Okay. So I understand what you're saying, Doctor. And fair to say that you think

your work is better?

A. Well, I believe in what we did.

Q. Okay.

A. And it does stand alone as a piece of work that involves children, as I said yesterday, from several countries and from multiple cities in the United States. And it's powerful.

Q. And sitting here today, you don't know what additional studies WHO evaluated for purposes of reaching their estimate, correct?

A. Correct.

MR. LANCIOTTI: Objection; foundation.

Q. Okay.

A. You know, yesterday, Mark, I used a word that, on reflection in the powerless darkness here last night, in looking at the low end of the dose-response curve in the Lanphear analysis -- and you were talking about the wide confidence in intervals, I used the word it's a matter of opinion. It's -- "opinion" was the wrong word.

Opinion, when you listen to opinions in a political sense, opinions, it's a matter of scientific judgment rather than opinion. And my feelings about that low end of the dose-response

curve, it's not my opinion. It's my scientific judgment about that.

Q. Okay. Thank you, Doctor. I appreciate that.

MR. TER MOLEN: I'd move to strike that as nonresponsive.

Q. But appreciate that.

Doctor, we talked yesterday about the Bradford Hill criteria, right?

A. Yes.

Q. And I'd like to talk about the Bradford Hill criteria in the context of the 2005 Lanphear estimate -- I'm sorry -- the 2005 Lanphear study, the pooled study that we were just talking about. Okay?

A. Sure.

Q. Okay. So with respect to temporality -- I'm just going to walk through the nine criteria, Doctor. If I recall correctly, you've got those criteria written down there on some notes that I'm sure you have handy.

But with respect to temporality, Doctor, I understand that the seven longitudinal studies involved certainly satisfy that criteria.

Would you agree with that?

MR. LANCIOTTI: Objection; form; foundation.

A. Yes.

Q. Okay. With respect to strength, I'd appreciate your thoughts on how the 2005 Lanphear pooled study satisfies the strength criteria.

A. Well, the strength of the association between the various lead measurements and child IQ is small in comparison to, as we just mentioned, the other predictors of child intelligence. And no one -- no one has ever debated that. Mother's education, mother's intelligence have larger impacts on a child's IQ than does lead. But it's there. It's there in each of the seven studies individually, and it is there in the pooled analysis.

And so strength of association is not huge, certainly, but it's consistent across each of the studies and in the pooled analysis.

Q. Okay. And what about consistency, Doctor? Can you explain, in your view, how the 2005 Lanphear study meets the Bradford Hill consistency criterion?

A. Well, the pooled analysis cannot address consistency in and of itself. I think the power of the term "consistency" relates to the fact that each of the seven studies, which were largely going on at the same point in time, each of us come down with the same conclusion. Each of us comes down with having found an association between lead exposure and child IQ. That's where the term "consistency" comes into play.

Q. And focusing -- so in your view, Doctor, is the consistency criterion simply an internal criterion? What you're describing, as I hear you say it, is internal consistency among the studies that were included in the study.

Is that your understanding of the focus?

A. It's consistency across studies. That's what Bradford Hill -- Sir Bradford Hill was alluding to --

Q. Yeah.

A. -- when he gave his now-famous lecture.

Q. Right. Exactly.

And so we're -- this criterion looks outside of the studies that were included in the Lanphear pooled analysis, and when you look

outside of the studies, we've -- and focusing on what we're calling low-level lead exposures, Doctor -- and for purposes of this discussion, we'll define low-level lead exposures as below 5 micrograms per deciliter blood lead level. Okay?

MR. LANCIOTTI: Objection; form; foundation.

A. Sure.

Q. Okay. And so looking at that, Doctor, I mean, we've certainly looked at a number of studies where -- that have not found the IQ association with blood lead level at that low-level exposure; would you agree?

MR. LANCIOTTI: Objection; foundation.

A. I would like to go back to the ATSDR toxicologic profile of lead in which they reviewed 40 epidemiologic studies that focused on blood leads of less than 10, not less than 5. But that was their -- that was -- and as a result of their analysis of 40 epidemiologic studies, not just these seven, looking at blood leads less than 10, they concluded that there was a causal relationship between blood lead and child IQ.

They didn't dissect it down to below 5. Okay? Is that helpful?

Q. Well, I understand what you're saying, Doctor, is you acknowledge they did not dissect down below 5, and we're focusing on -- for purposes of the questioning here this morning, we're focusing on low level, as we've defined it, which is below 5 micrograms per deciliter. And certainly you have seen yesterday, and again this morning, studies demonstrating that -- or there is not, in fact, a relationship between IQ loss and blood lead levels that are below 5, right?

MR. STERN: Object to form.

A. Let me say this. This dichotomizing the range of leads to less than 5 and more than 5 is a much less powerful approach than looking at blood lead as a continuous variable.

So in statistical terms, you know, you can just set a cut point and say I'm going to compare less than 5 or more than 5, or the more powerful approach is to look at blood lead as a continuum. And, you know, I don't want to get lost in the weeds, but it is more powerful to look at it as a continuous variable.

And the -- this Taylor paper looks at it in a dichotomous fashion. I don't know why they didn't look at it as a continuous variable. Perhaps the sample size is not sufficient, but...

Q. Well, Doctor, when you say "look at it as a continuous variable," what you're really saying, isn't it true, Doctor, that you're assuming that effects that you see at higher blood levels are occurring at lower blood lead levels, right?

MR. LANCIOTTI: Objection.

MR. STERN: Object to form.

A. We're not assuming anything. We're not assuming anything. We let the data speak for itself.

Q. Well, okay. But the Taylor study is actual data, right?

A. That's right.

MR. STERN: Object to form.

Q. Okay. And that data speaks for itself, right?

A. It is what it is, Mark.

Q. Sure.

A. You know, they have a prenatal blood

lead, and they looked later in life at child performance -- at child intelligence.

Q. And also --

A. I don't know what more to say on this point. I'm sorry.

Q. Okay. That may be true.

Okay. If you could walk us through the rest of the Bradford Hill criteria, Doctor, I'd appreciate it. We've looked at temporality and consistency and strength. Would you mind walking us through the other six?

A. Sure. Biological gradient, in other words, a dose-response relationship. And we certainly see that. Each of the seven longitudinal studies see a dose-response relationship.

Q. And let's just stick with that for a minute, Doctor. I think you mentioned yesterday that collectively, that pooled analysis includes approximately 1300 individuals, right?

A. Correct.

Q. Okay. And I think I suggested to you yesterday that of those 1300, there were only approximately 103 that had blood lead levels that

were tested that were at the level of 7.5 micrograms per deciliter or lower.

Do you recall that?

A. I do, yes.

Q. Okay. Sitting here today, do you disagree with that number?

A. No, I don't.

Q. Okay. And with respect to that number, Doctor, it's fair to say, is it not, that for that 103, that they may well have had blood lead levels higher than 7.5 micrograms per deciliter at other times, right?

MR. LANCIOTTI: Object to form.

A. That's plausible.

Q. Okay. Go ahead, please, Doctor, with -- you were talking about the biological gradients, and if you've finished that, feel free to move on.

A. Sure. The next criterion is coherence. Are findings coherent one to the next to the next. And, of course, there's never 100 percent coherence. The quality of studies varies. But there is powerful coherence across the seven quite unique longitudinal studies that looked at blood lead levels from prenatal period of time across

through, in our case, through age 12, in other case, actually on through later in adolescence.

So there's powerful coherence.

I have to say, you know, we -- many of these groups, the United States group, the Australia group, the Mexico group, met under the auspices of the US EPA during the course of the studies to -- and it was a gentleman named Lester Grant at EPA who really wanted us to do things in a manner so that we could eventually do this pooled analysis, you know. Let's all use the same assessment of intelligence, the WISC. Let's all use the same assessment of the quality home -- quality of the home-rearing environment and so on and so forth.

So the powerful thing here is these studies were essentially going on at the same point in time. And we were all seeing -- it's like developing a piece of film. We -- you know, you see it start to come to life. We were all seeing the same thing as -- over the years as this was done.

So the coherence here is powerful. And we saw it in real time.

Q. I appreciate that, Doctor. Thank you.
A. The next criterion?
Q. And I do understand the film analogy. I'm not sure you can use that much longer. I do understand that.
A. I used to love working in the darkroom.
Q. Sure.
Next criterion. Thank you.
A. The next is biological plausibility. And here, we're basically talking about mechanism. Is there evidence in experimental model, animal systems, or cellular systems, that demonstrates an adverse impact of lead on the underlying biology. And we touched on this yesterday, that the literature there is totally vast. And so there are many, many, many mechanisms.
Now, I don't think anyone agrees that there's just one mechanism, but it's a constellation of mechanisms.
One of the powerful observations in this regard, I talked yesterday about how the 1-year-old brain has the most neuronal connections, and then there's this pruning back. Some of the powerful observations in terms of

biology is that lead actually leads to a disordered pruning back of neuronal connections. And so I won't belabor it, but the biology -- the biological plausibility is certainly there.

Next?

Q. Yes. Thank you.

A. Experiment. Can you do an experiment that tests the association. Here, quite honestly, the only experiment that I can cite was a large clinical trial run by NIEHS, National Institute of Environmental Health Sciences, that asked the question, is the impact of lead on child IQ reversible? And they actually did a trial with the drug that I developed, with succimer. And I was not a member of that study team. I was actually a monitor, if you will, somebody who audited the sites.

And there, the answer was no, that if you take children, I believe the eligibility criteria was that child had to have a blood lead of 25 micrograms per deciliter. I could be wrong. Maybe it was -- maybe it was 30 or thereabouts. But they did a trial, very carefully controlled trial, to see, can we reverse the adverse

association?

And the answer was no, sadly. So that was an experiment, if you will, that sadly proved that the consequences of lead on child intelligence are not reversible when you give a drug to lower the blood lead concentration.

Q. Thank you, Doctor.

And, Doctor, one of the hallmarks of the scientific method is that the results should be reproducible, right?

A. Yes.

Q. That other scientists conducting the same analysis should reach the same results, right?

A. Say that again, Mark?

Q. Sure.

Other scientists conducting the same analysis should reach the same results, right?

A. Same analysis of what?

Q. Well, other scientists conducting the same analysis of the --

A. Do you mean the same experiment?

Q. Yes. Other scientists conducting the same experiment should reach the same results.

A. Hopefully.

Q. Okay. Well, that's one of the hallmarks of the scientific method, right?

MR. LANCIOTTI: Objection; form.

A. Well, it's one of the hallmarks of reaching causal inferences.

Q. Okay. And certainly here, looking at others who look at the same data, the obvious example is Crump, right?

A. Right.

Q. Okay. And as we've noted yesterday, when Crump looked at the low-level area that we're focusing on today, meaning blood lead levels of 5 or less, Crump reached a different conclusion than Lanphear and you reached in the 2005 paper, right?

MR. LANCIOTTI: Objection; form.

A. Well, this is where I come to the point I made earlier. At some point, there's judgment involved, you know. Sir Bradford Hill, I mentioned yesterday, at the end of his lecture pointed out that we should not live and die by statistical significance. We need to look at the larger picture, the larger body of evidence across

these many criteria that we're talking about today, in order to reach causal inferences. And I respect Crump. I respect -- you know, I didn't mean to in any way -- what's the term -- I respect that group of scientists. I know some of them. I know the Gradient Corporation. Yes, they're a consulting firm, but they do great -- they do great work. I know Barbara Beck quite well. She's a very distinguished scientist. It's -- but it comes down to a matter of scientific judgment when it comes down to that very low range.

I don't know how else to say it.

Q. Okay.

A. Now, the group who did the pooled analysis -- the original Lanphear pooled analysis, we've worked our whole lives on lead, and we know the broad picture, all of the criteria we've gone through here this morning. A consulting firm comes in and looks at a dataset, and their scientific judgment when it comes down to that low range is based on a single dataset, which they analyze very nicely.

What I'm saying is my scientific judgment about that low range is based on the

constellation of things that we've talked about.

Q. I understand, Doctor. Thank you.

A. People can differ.

Q. Appreciate that. Thank you.

A. Most of the scientists can differ.

Q. Ready for the next criterion, Doctor, if you are.

A. The last one, quite frankly, is analogy. And I don't know -- I'm at a loss -- I need to go back and look at Bradford Hill's lecture to discern exactly what he was referring to there. So I -- I have no answer for that one.

Q. Okay. That's fine. I appreciate that.

MR. TER MOLEN: Why don't we, Doctor, take a break for 10 minutes and I'm going to go through my materials and we'll look to see if we can wrap this up. Okay?

THE WITNESS: Terrific.

VIDEOGRAPHER: The time is 9:36 a.m., and we're off the record.

(Recess taken.)

VIDEOGRAPHER: The time is 9:56 a.m., and we're on the record.

MR. TER MOLEN: Doctor, thank you for

your time. We've determined we have no further questions on our end.

We're happy to pass the witness to anybody else who does.

THE WITNESS: Thank you.

MR. KENT: Dr. Graziano, this is -- where am I -- David Kent for the LAN defendants.

And I want to thank you for your time and thoughtful answers, but we have no further -- no questions ourselves.

THE WITNESS: Thank you very much, David.

MR. BERG: This is Rick Berg. No questions for the City.

THE WITNESS: Thank you, Rick.

MR. TER MOLEN: Doctor, I think that means that we're done. And thank you for --

MR. STERN: No, no. This is Corey Stern. I have one question for the doctor.

THE WITNESS: Sure.

EXAMINATION

BY MR. STERN:

Q. Dr. Graziano, this is Corey Stern. I represent a number of plaintiffs in this

litigation. I was appointed as lead counsel for all individual plaintiffs in state court. I was appointed as co-liaison counsel for individual plaintiffs in federal court, though I'm not sure how long that appointment is going to last.

Notwithstanding that, Mr. Ter Molen asked you a number of questions related to the significance of particular lead levels.

Do you recall questions of that manner?

A. Yes, I do.

Q. You would agree with me, sir, that any particular lead level that shows up on a blood lead test is dependent on when the child or individual was actually exposed to lead, correct?

MR. TER MOLEN: Objection; form; foundation; vague.

A. To some extent, yes.

Q. Well, let me ask you this. If a child was exposed to high levels of lead on January 1st, 2015 and no lead level was taken at that time but was taken -- a blood lead test was taken, say, on April 1st, 2015, and that child had a lead level of 2 on April 1st, 2015, would you agree that the child's highest lead level would not be indicated

on the April 1st test?

MR. TER MOLEN: Objection; form; foundation; vague; incomplete hypothetical.

A. It would depend, of course -- you mentioned a January 1st exposure. It would depend when the exposure stopped.

Q. Okay. Let's assume for a minute that the exposure stopped on January 1st --

A. Then a measurement --

Q. -- in that hypothetical.

MR. TER MOLEN: Same objections.

A. Sure.

Then a measurement in April would be -- the blood lead would be a fraction of what it was back in January.

I mentioned, I believe, yesterday, that the half-life of lead in blood is approximately one month. So one could backtrack using that parameter and say, well, if it was -- if it was blood lead of 2 in April, well, in March it was 4, in February it was 8, and in January it was 16.

Q. So for all of the questions that Mr. Ter Molen asked you that involved static blood levels, and in particular, when he asked you would

you expect something -- something to the effect of would you expect for there to be significant cognitive deficits for a child with a lead level of 2, your assumption in answering each of those questions was that the exposure that led to the lead level of 2 or lead level of 4, or whatever hypothetical Mr. Ter Molen gave you, was a recent exposure and not an exposure that may have ended 3, 4, 5, 7, 12, 18 months earlier, correct?

A. That is correct.

MR. TER MOLEN: Objection; form; foundation; vague; misstating the record.

Q. Your answer, sir?

A. That is correct.

Q. So for a child, for instance, who had a lead level of 2, which I believe yesterday you had a long conversation with Mr. Ter Molen about, where you indicated, using your fingers very slightly, you put them very closely together so you could barely see the space between the fingers when you were describing the amount of cognitive deficits you might expect to see for a child who had a lead level of 2. You would agree with me, sir, that if that lead level was taken, say, on

April 1st, 2015, but the exposure for that child actually ended, say, on January 1st, 2014, 15 or 16 or 17 months earlier, your answer and the space between your two fingers would have changed dramatically depending on what you knew about when that exposure ended, correct?

MR. TER MOLEN: Objection; form; foundation; misstating the record.

A. That is very correct. The space between my fingers would have been much larger. As I said, one can backtrack since we know the half-life of lead in blood.

Q. Right.

A. And I won't repeat --

Q. Sure.

A. -- but in March it was 4 and so forth.

Q. And so if Mr. Ter Molen or one of the 20-or-so lawyers who represent Veolia were to show a video at trial of you squinting and putting your two fingers together ever so slightly to express on video how little cognitive deficits you would expect for a child with a lead level of 2, it would be most appropriate for them to explain to the jury when the exposure actually ended for that

particular child for whom they're showing the video, correct?

MR. TER MOLEN: Objection; form; foundation; improper question; move to strike.

A. Absolutely correct.

MR. STERN: Okay. I have no further questions at this time.

Oh, go ahead. Sorry. Please, finish your answer.

A. And it's a very important point that you bring up.

MR. STERN: Thank you.

I have no further questions for the witness at this time.

MR. TER MOLEN: No further questions here.

MR. STERN: Now I think we're probably done.

VIDEOGRAPHER: The time is 10:03 a.m. This deposition has concluded, and we're off the record.

(Signature not waived.)

Thereupon, the deposition was concluded at 10:03 a.m.

STATE OF NEW YORK:
SS:
COUNTY OF _____:

I, JOSEPH GRAZIANO, PH.D., do hereby certify that I have read the foregoing transcript of my deposition given on October 30, 2020; that together with the correction page attached hereto noting changes to form or substance, if any, it is true and correct.

_____
JOSEPH GRAZIANO, PH.D.

I do hereby certify that the foregoing transcript of the deposition of JOSEPH GRAZIANO, PH.D. was submitted to the witness for reading and signing; that after he had stated to the undersigned Notary Public that he had read and examined his deposition, he signed the same in my presence on this ____ day of _____, 2020.

_____
NOTARY PUBLIC, NEW YORK

My commission expires: _____

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CERTIFICATE

I, Sara S. Clark, Registered Merit Reporter, Certified Realtime Reporter, Certified Realtime Captioner, a Notary Public, duly commissioned and qualified, do hereby certify that the within-named JOSEPH GRAZIANO, PH.D. was duly remotely sworn to testify to the truth, the whole truth, and nothing but the truth.

I DO FURTHER CERTIFY that the foregoing is a verbatim transcript of the testimony as taken stenographically by me at the time, place, and on the date hereinbefore set forth, to the best of my ability.

I DO FURTHER CERTIFY that I am neither a relative nor employee nor attorney nor counsel of any of the parties to this action, and that I am neither a relative nor employee of such attorney or counsel, and that I am not financially interested in the action.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my seal on this 13th day of November, 2020.

Sara S. Clark

Sara S. Clark, RPR/RMR/CRR/CRC
Notary Public
Registered Merit Reporter
Certified Realtime Reporter
Certified Realtime Captioner

My commission expires: March 10, 2023